

applications, to page 1 of the specification, which paragraph is to be added immediately after the title of the invention and just before the heading entitled "The Technical Field."

--This is a continuation of Application Serial No. 09/713,614, filed November 15, 2000, entitled Antenna Control System, now U.S. Patent No. 6,346,924, which is a continuation of Application Serial No. 08/817,445, filed October 16, 1995, entitled Antenna Control System, now U.S. Patent No. 6,198,458 B1.--

2. Please add the following paragraph on Page 8 just before the heading entitled "Best Mode for Carrying out the Invention":

--Figure 9 shows an antenna system according to one aspect of the present invention having a plurality of antennas controlled by a controller.--

REPLACEMENT PARAGRAPHS TO THE SPECIFICATION:

Please delete the following paragraphs and replace them with the following replacement paragraphs, respectively, such that the replacement paragraphs are shown immediately below with all changes included, (e.g., additions, deletions, modifications) pursuant to 37 C.F.R. 1.121(b)(1).

3. Please delete the paragraph of page 1 of the specification beginning immediately after the heading entitled "The Technical Field." The first sentence of that paragraph was erroneously amended by the Preliminary Amendment filed December 18, 2001 to include a cross reference to related applications. Accordingly, please replace that paragraph with following replacement paragraph, which restores the paragraph to its original condition prior to the Preliminary Amendment filed December 18, 2001:

--The present invention relates to an antenna control system for varying the beam tilt of one or more antenna. More particularly, although not exclusively, the present invention relates to a drive system for use in an antenna which incorporates one or more phase shifter.--

4. Please delete the fifth paragraph (fourth full paragraph) on page 6 and replace it with

the following replacement paragraph:

Preferably the system includes a plurality of antennas and the controller may adjust the downtilt for the plurality of antennas and store the degree of downtilt of each antenna in memory.

5. Please delete the fourth paragraph (third full paragraph) on page 9 and replace it with

the following replacement paragraph:

Referring now to figure 4, operation of the phase shifter drive mechanism will be explained. Second portion 9 of phase shifter 1 is mounted to a carriage 22 which can move left and right. If carriage 22 is moved to the left first portions 14 and 15 of phase shifters 2 and 3 will be moved to the left via push rods 10 and 11. First portion 8 of phase shifter 1 may be moved relative to second portion 9 of phase shifter 1 to vary the phase of signal supplied to phase shifters 2 and 3.

6. Please delete the first (a partial paragraph) on page 11 and replace it with the

following replacement partial paragraph:

the first embodiment except for the drive mechanism 30 employed, which is shown in figure 6.

7. Please delete the last paragraph (a partial paragraph) on page 11 and replace it with

the following replacement paragraph:

Operation of the drive means according to the second embodiment will now be described by way of example. Motor 41 may rotate shaft 31 in an anticlockwise direction, viewed from right to left along shaft 31. Threaded member 37 is driven by second threaded

8. Please delete the third paragraph (second full paragraph) on page 12 and replace it

with the following replacement paragraph:

The conductivity of reed switch 43 is monitored so that the number of rotations, or part rotations, of shaft 31 may be monitored. If the motor continues driving shaft 31 until threaded member 34 abuts the lever of limit switch 45 then logic circuitry will only permit motor 41 to drive in the opposite direction. Likewise if threaded member 34 abuts the lever of limit

switch 46 the motor 41 will only be permitted to drive in the opposite direction.

9. Please delete the first paragraph (a partial paragraph) on page 13 and replace it with the following replacement paragraph:

Components of the drive mechanism 30 are preferably formed of plastics, where possible, to reduce intermodulation. Threaded members 34 and 37 preferably include plastic links to phase shifter 36 to reduce intermodulation.

10. Please delete the third paragraph (second full paragraph) on page 13 and replace it with the following replacement paragraph:

FIG. 7 shows how motor 41, reed switch 43 and switches 45 and 46 are connected to lines 71, 72, 76 and 77 from an external controller. Lines 71, 72, 76 and 77 are sheathed by conduit 78. Lines 71 and 72 supply current to drive motor 41. Section 73 ensures that if threaded member 34 is driven to either the left-hand side limit or the right-hand side limit it can only be driven in the opposite direction. In the position shown in FIG. 7, switch 45 directly connects line 71 to switch 46 via diode 74. In the position shown switch 46 connects line 71 to motor 41 via diode 75. This is the normal position of the switches when threaded member 34 is not at either extreme limit. When threaded member 34 is driven to the extreme left, for example, and actuates switch 45, then switch 45 open circuits the path via diode 74. Diode 74 allows current flow in the direction allowing motor 41 to drive to the left. Accordingly, when switch 45 is open, motor 41 can only drive in such a direction as to drive threaded member 34 to the right (i.e.: current in the direction allowed by diode 75).

11. Please delete the last paragraph on page 14 and replace it with the following replacement paragraph:

The controller will sense that threaded member 34 is at its extreme right position as it will detect that reed switch 43 is not opening and closing. After a predetermined delay the controller may then provide a current in the opposite direction via lines 71 and 72 to motor 41 to drive it to the left. As the motor is driven to the left the controller will monitor the opening and closing of reed switch 43 to determine how far threaded member 34 has moved to the left. The controller will continue to move threaded member 34 to the left until reed switch 43 has opened and closed a predetermined

number of times, corresponding to a desired angle of downtilt. Alternatively, threaded member 34 may be driven to the extreme left and then back to the right.

12. Please delete the first paragraph on page 15 (a full paragraph) and replace it with the following replacement paragraph:

As shown in Figure 9, at an antenna site a number of such panels 90 may be installed and controlled by a single controller 80 as shown in figure 8. The four wires 71, 72, 76, and 77 correspond to respective cable groups 78 to three such antenna panels. Controller 80 may be provided at the base of an antenna site to allow an operator to adjust the tilt of a plurality of antennas at ground level, rather than requiring a serviceman to climb up the antenna structure 92 and adjust each antenna manually. Alternatively, controller 80 may be a hand-held unit which can be plugged into a connector at the base of an antenna to adjust the antenna at a site.

13. Please delete the last paragraph (a partial paragraph) on page 16 and replace it with the following replacement paragraph:

The up/down buttons may be used to select the desired array. The enter key will accept the selected array. To measure the actual angle of downtilt controller 80 drives a motor 41 of an array to drive member 34 to the right. Motor 41 is driven until threaded member 34 abuts switch 46. The controller 80 counts the number of pulses from reed switch 43 to determine how far threaded portion 34 has traveled. At the extreme right position the controller 80 determines and displays

14. Please delete the first paragraph (a partial paragraph) on page 17 and replace it with the following replacement paragraph:

the angle of downtilt, calculated in accordance with the number of pulses connected from reed switch 43. The controller 80 then drives threaded member 34 back in the opposite direction for the same number of pulses from reed switch 43 so that it returns to the same position. The angle of downtilt for each antenna may be stored in memory of controller 80. This value will be updated whenever the actual angle of downtilt is measured in this way. The "measure tilt" function may not be used if the controller is locked.

15. Please delete the third paragraph (second full paragraph) on page 17 and replace it